Southern California Gas Company's and San Diego Gas & Electric Company's

Comments on the 2009 IEPR by:
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Workshop on Natural Gas Activities

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Shale Gas Issues

- Can future production of natural gas from shale formations meet expectations of the natural gas industry?
  - There is a huge shale gas resource base in the US and Canada estimated at 1500 to 2000 Tcf.
  - Technological advances in drilling and hydraulic fracturing have lowered development costs making more of the resource base economically feasible helping to close the supply gap resulting from declines in conventional exploration and production and increased demand for gas in power generation.
- Are the current shale reserve estimates reliable? Could they be improved? How?
  - Reserve estimates are as reliable as the gas price forecast used to estimate economically recoverable resources. The resource base is well known and reliable estimates have been available for decades. Technological advances in drilling and fracturing technology have transformed the known resource base into economically recoverable reserves.
- How can the current pricing environment affect drilling programs scheduled for natural gas shale formations?
  - The current decline in gas prices has reduced the number of active drilling rigs significantly. Marginal drilling rigs have been shut down leaving more efficient rigs still operating. However, horizontal drilling in shale formations has declined at a much lower rate.

Shale Gas Issues

- How might potential environmental impacts affect future drilling and production of natural gas from shale formations?
  - Hydraulic fracturing requires large amounts of water and sand that has to be trucked in and then the waste water has to be transported to a wastewater treatment plant for recovery.
  - Horizontal shale well drilling, according to the Texas Railroad Commission web site, requires about 5 times the amount of water compared to a conventional vertical well.
  - Water shortages in some areas may slow development.
- Is natural gas from shale formations a viable long-term source of natural gas for the United States?
  - Yes, since the known shale gas resource base is so large and further advances in drilling and fracturing technology will make shale gas a reliable source of gas supplies for the long term.
  - Pipeline construction is accelerating to bring new shale supplies to the market in the southeast US and other areas where increased demand for power generation requires new supplies.
- Can natural gas from shale formations continue to gain demand-side market share?
  - According to Ziff Energy Group, the well-respected Canadian energy forecasting group, shale, tight sands and other unconventional gas production will supply about one half of North America's gas demand by 2020.
  - Ziff estimates that 16 Bcf/day of shale gas will be on line by 2020.
  - Ziff says that advances in horizontal drilling technology and multistage hydraulic fracture stimulation have made shale gas production economic.

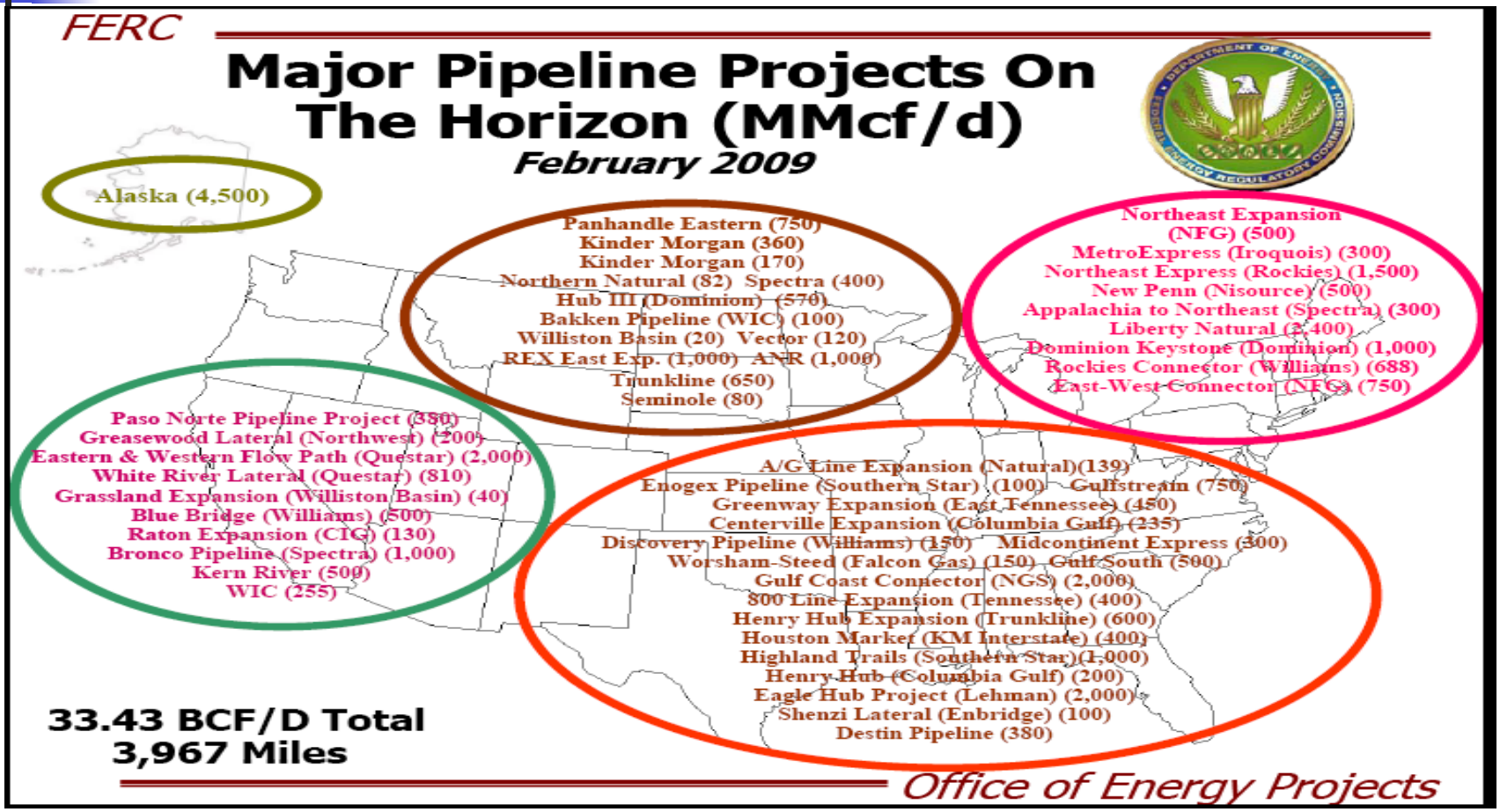
Shale Gas Resources are extensive in the US and Canada.

At an economically viable development range of US $4 to $8 per Mcf:
US shale gas potential is from 500 to 1000 Tcf,

Canadian potential estimated at 1000 Tcf. (Source: Schlumberger, 2005)

Shale Gas Plays, Lower 48 States

Pipeline construction to bring shale and other unconventional gas supplies (Coal Bed Methane and tight sands) and Rockies supplies on line is extensive.



LNG Issues

- What factors help to determine landed LNG prices in the United States, Europe and Asia?
  - Internationally LNG prices are tied to oil prices with lag adjustments.
  - LNG producing countries will try to market their product to take advantage of higher priced international markets.
  - Currently worldwide demand for LNG has fallen due to the decline in economic output making the US the market of last resort.
  - LNG storage is limited internationally while the US has about 4 Tcf of gas storage capacity available, making US markets desirable for LNG shippers looking for price arbitrage opportunities.
  - In addition, significant new LNG liquefaction capacity equivalent to 6.24 Bcf/d is coming on line in 2009 from Russia, Qatar, Indonesia and Yemen and potentially another 4 Bcf/d in 2011 from other countries adding to the near term supply glut.
  - Therefore, more LNG is forecast to be delivered to the US at prices competitive with domestic supplies in 2009 and 2010.
- How much LNG could be available to U.S. importers given the large price differences between the United States, European and Asian markets?
  - Currently the Asia-Europe to US gas price differential has narrowed as oil prices have dropped from $140/BBl to around $50/BBl making the US market more attractive.
  - Potentially 1 to 2 Bcf/d could be available to the US in 2009 and as much as 6 Bcf/d in 2011 if the global economy is slow to recover.
- What other non-economic factors could drive the development of LNG?
  - In several oil producing counties associated gas is still being flared making LNG liquefaction an attractive option for additional revenues for host countries while providing benefits in the fight against Global Warming.

LNG Issues

- What are the prospects that natural gas exporting countries could develop into an energy cartel similar to OPEC?
  - There have been discussions among large gas producing countries such as Russia, Iran and Algeria but the LNG producing countries are very diverse politically and geographically and therefore an OPEC-style cartel would be difficult to effectively control supply and prices.
- What is the relative balance of liquefaction and re-gasification facilities and LNG tankers available to transport the gas?
  - Liquefaction capacity, LNG tankers and re-gasification facilities are all expanding at a rapid rate in general lock step with each other internationally.
  - In the US, re-gasification facilities have been ahead of the curve awaiting LNG liquefaction capacity to catch up.
- What additional LNG terminals may be constructed on the West Coast?
  - Currently the Oregon Jordan Cove LNG project is moving along while most other proposals in California and Mexico have been dropped or are moving at a slower pace.
  - **An LNG export terminal is being proposed at Kitimat, British Columbia, Canada**
- Could natural gas from shale formations displace the importation of LNG into the United States and Canada?
  - LNG and shale-based gas supplies will be needed for power generation as coal power station development slows and conventional gas supplies continue to decline at a rapid rate.
- How do life-cycle carbon emissions LNG compare to that of coal-fired generation and how should they be addressed by regulators?
  - On a life-cycle basis LNG has fewer emissions than clean coal plants and far fewer compared to a standard coal plant.
  - West coast delivered LNG is estimated to have a GHG Emissions Intensity of 1,176 Lbs. CO2e/MMbtu compared to 2,283 Lbs. CO2e/MMbtu for a standard coal plant.
  - All LNG delivered to the US will meet FERC and state regulatory commissions' gas quality standards.

Life Cycle CO_2 Emissions: LNG versus Coal

Domestic Natural Gas, LNG and Coal: Life Cycle CO_2 and Methane Emissions AVERAGES

	Lbs CO_2 /MMBTU Domestic Gas	Lbs CO_2 /MMBTU LNG Imports	Lbs CO_2 /MMBTU Coal	Lbs CO_2 /MWh Domestic Gas	Lbs CO_2 /MWh LNG Imports	Lbs CO_2 /MWh Coal
Burner Tip	117.06	117.06	12.5	814.2	813.6	131
Distribution	2.98	2.98		20.7	20.7	
Transmission	5.49	0.13		38.2	0.9	
Regasification	0	1.75		0.0	12.2	
Shipping	0	6.07		0.0	42.2	
Liquefaction	0	9.52		0.0	66.2	
Processing	6.64	6.46		46.2	44.9	
Production	13.1	1.57		91.1	10.9	
E&D	0.5	0.37	205	3.5	2.6	1,153
Total	145.78	145.92	217.5	1,013.9	1,014.1	2,283

Source: "Greenhouse Gas Life-Cycle Emissions Study: Fuel Life-Cycle of U.S. Natural Gas Supplies and International LNG," prepared by Advanced Resources International, Inc. And ICF International Monday, November 10, 2008

Natural Gas Pipelines and Infrastructure Issues

- Could natural gas demand growth in upstream markets further limit California's supply access via existing infrastructure?
  - Existing pipeline and storage infrastructure is adequate to meet California gas demand requirements in the next 20 years.
  - Gas demand in California is forecast to be relatively flat due to energy efficiency savings and new renewable electric supply capacity.
- Will winter and summer natural gas peak demand in the United States continue to grow at current rates?
  - Winter gas demand peaks are moderating with increased emphasis on energy efficiency.
  - Summer peak gas demand for power generation is moderating due to increased availability of renewable sources of electric energy supplies.
- How could daily natural gas demand change as renewable technologies are added to the electric resource mix?
  - Daily gas demand will probably become more volatile as renewable sources; such as, wind and solar, are added to the electricity supply mix requiring gas-fired peaking units to be brought on line when renewable supplies drop.
- Can both an Oregon LNG terminal and a Rockies pipeline that add natural gas supply into PG&E at Malin be constructed?
  - Oregon-based LNG and Rockies supplies at Malin would have to compete on a price basis to enter the California market.
  - More supply at Malin will help to moderate gas prices in California.

Natural Gas Pipelines and Infrastructure Issues

- What additional natural gas storage might be constructed or expanded in California?
  - SoCalGas is planning to expand gas storage in Southern California by 7 BCF over the next 6 years as part of a settlement in the 2009 BCAP Phase One.
- How much and for how long could Rockies natural gas be siphoned east of the Rockies?
  - Rockies supplies are adequate to provide 1 to 2 Bcf/d of supplies to the US Midwest and east for the next 20 years.
- Could shale supply of natural gas displace Rockies and southwest-produced gas that currently flows to the east part of the country so that such gas becomes available to California?
  - Yes, with the expansion of pipeline capacities throughout the US gas supplies will become more fungible and competitive reducing the current price differentials between the eastern and western US.
- What role would LNG from Costa Azul and possibly from a new facility off the southern California coast play in California's future natural gas supply mix?
  - Costa Azul-sourced gas will add to Mexico's, California's and the US Southwest's supply mix and thereby moderate gas prices.
  - New LNG facilities, if they are built off So. California, would also help moderate gas prices in the Southwest US and Mexico.
- What additional pipelines bringing gas from the Rockies can be constructed to the West Coast?
  - The Ruby, Sunstone and Bronco pipelines are all proposals that could bring additional Rockies supplies to California and the Northwest.
  - Ruby is currently before the FERC for approval.

Proposed Construction of New Gas Transmission Lines in the West

- **Phoenix Expansion** (by Transwestern Pipeline): Additional 0.5 Bcf/day of year-round natural gas pipeline transportation capacity to serve the central and southern Arizona markets. Service commenced March 1, 2009.
- **Rockies Express Pipeline** (REX - by Kinder Morgan, Sempra Pipeline, Connoco Phillips): 1.8 Bcf of capacity and 1,679-mile natural gas pipeline system from Rio Blanco County, Colorado, to Monroe County, Ohio to connect supplies from the Rockies to demand centers in the northeast. It is composed of 3 segments: Entrega in Colorado and Wyoming, West from Wyoming to Missouri, and East from Missouri to Ohio. The project is currently on the third segment and gas is expected to be flowing to Illinois by April 2009 and continue on to just a few miles shy of West Virginia state line.
- **Ruby Pipeline** (by El Paso Pipeline): 1.5 Bcf/Day of initial capacity beginning at Opal Hub in Wyoming and terminating at Malin, Oregon. Expected service date is March 2011.
- **Sunstone Pipeline** (by Williams Gas Pipeline, Transcanada Pipeline, Sempra Pipeline): 0.5 Bcf/Day of capacity beginning at Opal, Wyoming to Stanfield, Oregon. Expected service date is 2011.
- **Bronco Pipeline** (by Spectra Energy): 1.0 Bcf/day of capacity beginning at Wyoming to Malin, Oregon. Expected service date is 2011.

Gas Supplies and pipeline delivery capacity to California are more than adequate to meet even high demand periods of cold winters and low hydro conditions.

SOUTHERN CALIFORNIA

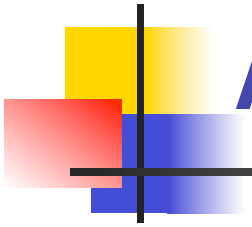
Upstream Capacity to Southern California

Pipeline	Upstream Capacity (MMcf/d)
El Paso at Blythe	1,410
El Paso at Topock	540
Transwestern at Needles	1,150
PG&E at Kern River	650 (1)
Southern Trails at Needles	80
Kern/Mojave at Wheeler Ridge	885
Kern at Kramer Junction	500
Occidental at Wheeler Ridge	150
California Production	310
TGN at Otay Mesa	400
North Baja at Blythe	1,200
Total Potential Supplies	7,275

(1) Estimate of physical capacity.

SoCalGas' firm storage capacity is more than adequate to help customers reduce their exposure to price fluctuations along with hedging and fixed price purchase of gas.

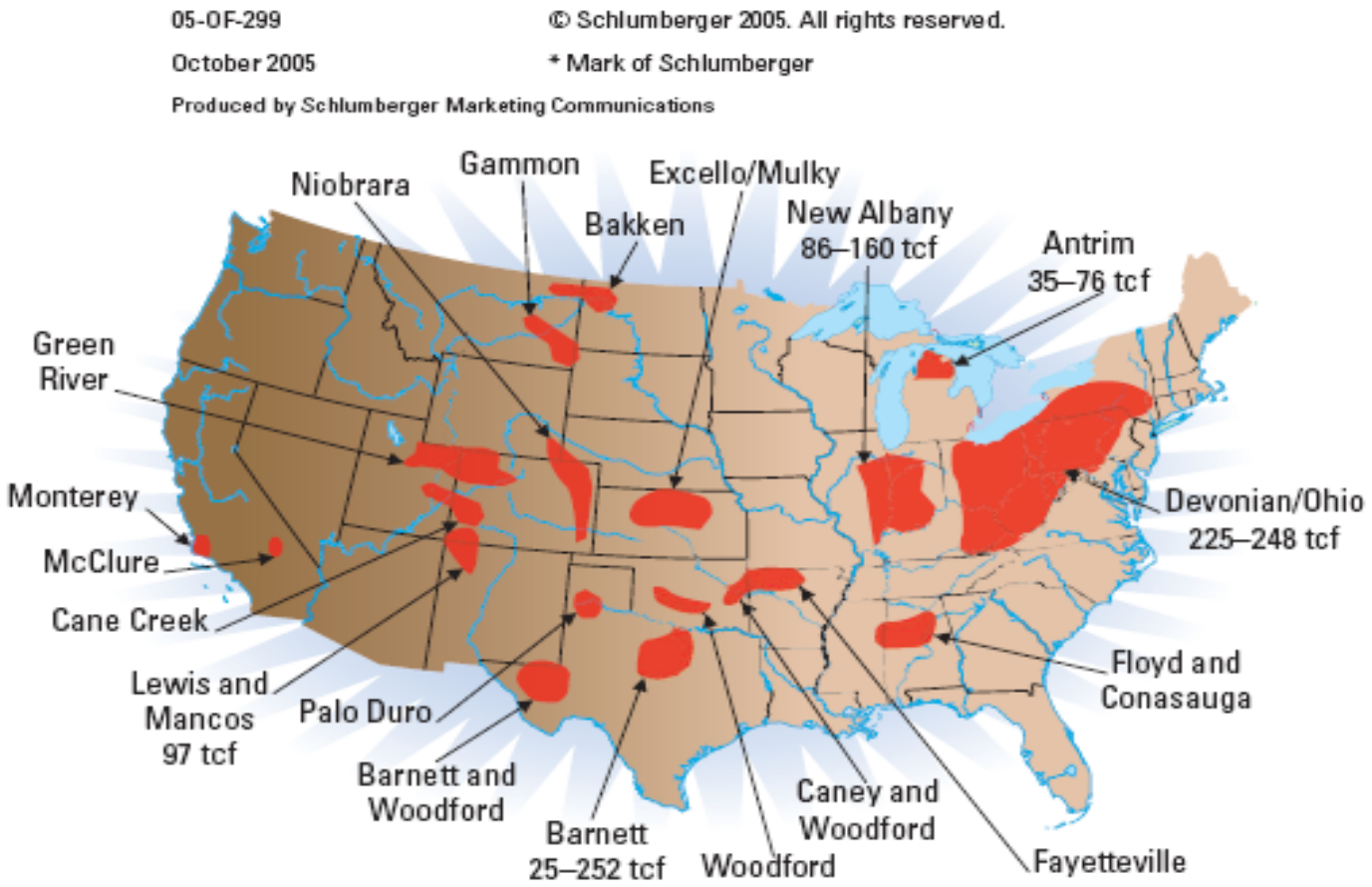
- Balancing service capacities
  - Inventory 4.2 BCF
  - Injection 200 MMcfd
  - Withdrawal 340 MMcfd
  - Monthly Balancing +/- 10%
- Firm storage capacities
  - Inventory 131 BCF
  - Injection 850 MMcfd
  - Withdrawal 3,195 MMcfd
- Planned storage capacity additions 2010-2014
  - Inventory 7 BCF
  - Injection 145 MMcfd



APPENDIX

APPENDIX:

US Shale gas potential is from 500 to 1000 Tcf at $4 to $8/Mcf.



Major shale gas basins in the United States with total resource potential of 500 to 1,000 tcf.

APPENDIX:
Canadian shale gas potential is estimated at 1000 Tcf.

Source: Schlumberger 2005

British Columbia

- Horn River Basin > 500 TCF OGIP
- Cordova Embayment > 200 TCF OGIP
- Montney Formation up to 250 TCF OGIP
- Doig Phosphate up to 164 TCF OGIP
- Nordegg Formation 1-24 Bcf/section
- Exshaw Formation 25 – 180 Bcf/section

From BCMEMPR

Total > 1000 Tcf OGIP

Alberta and Saskatchewan

- Colorado Group > 300 TCF OGIP

Southern Ontario

- Michigan Basin > 225 Bcf OGIP

Quebec Lowlands

- Utica and Marcellus Shale 2-15 TCF OGIP

Maritimes

- Windsor Basin (Nova Scotia) 89 – 109 Bcf/section

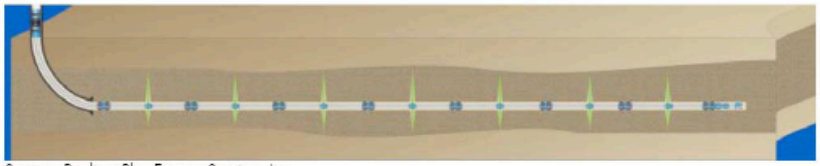
APPENDIX:
Shale gas development is economic at $4.50 to $7.50/ MMbtu depending on resource rock properties and thickness of formation.

Keys to Success

- Technology
  - Drilling and logging
  - Multiple well orientations from single surface wellpads
- Well spacing and orientation: Downspacing
  - Improves ultimate recovery
  - Sustains production levels – slows field declines
- Application of Multi-Stage Fracing Critical to Unlocking Resource Potential

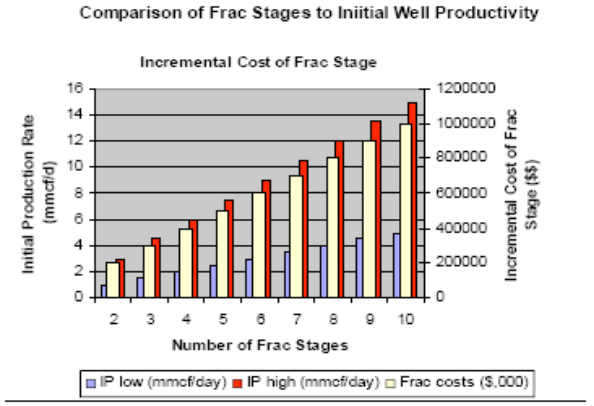
Each additional frac increases initial well productivity by 0.5 to 1.5 mmcf/d

Each additional frac potentially increases recoverable reserves by 0.5 to 1.5 Bcf



Source: Packers Plus Energy Services Inc.

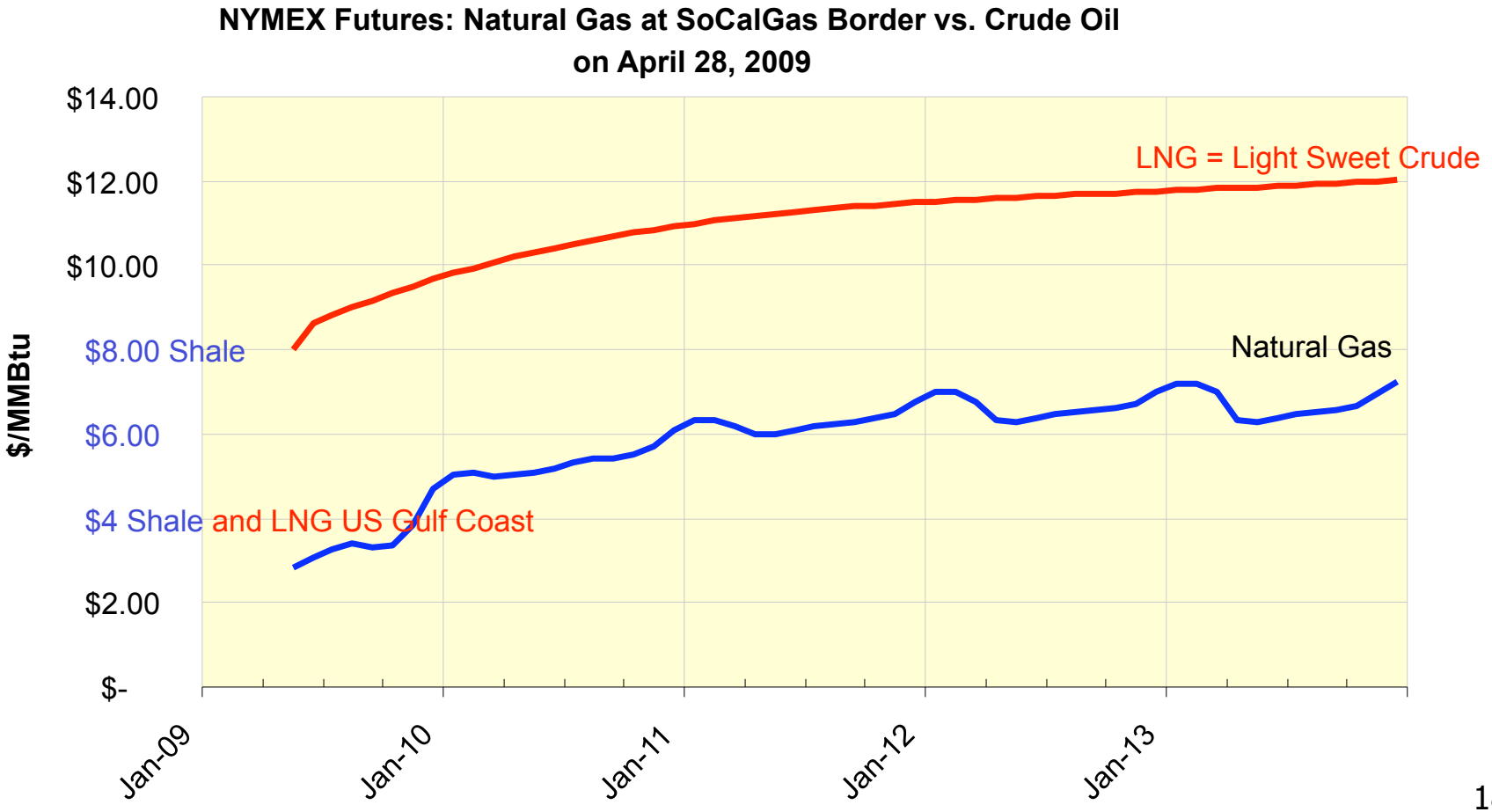
from Halliburton



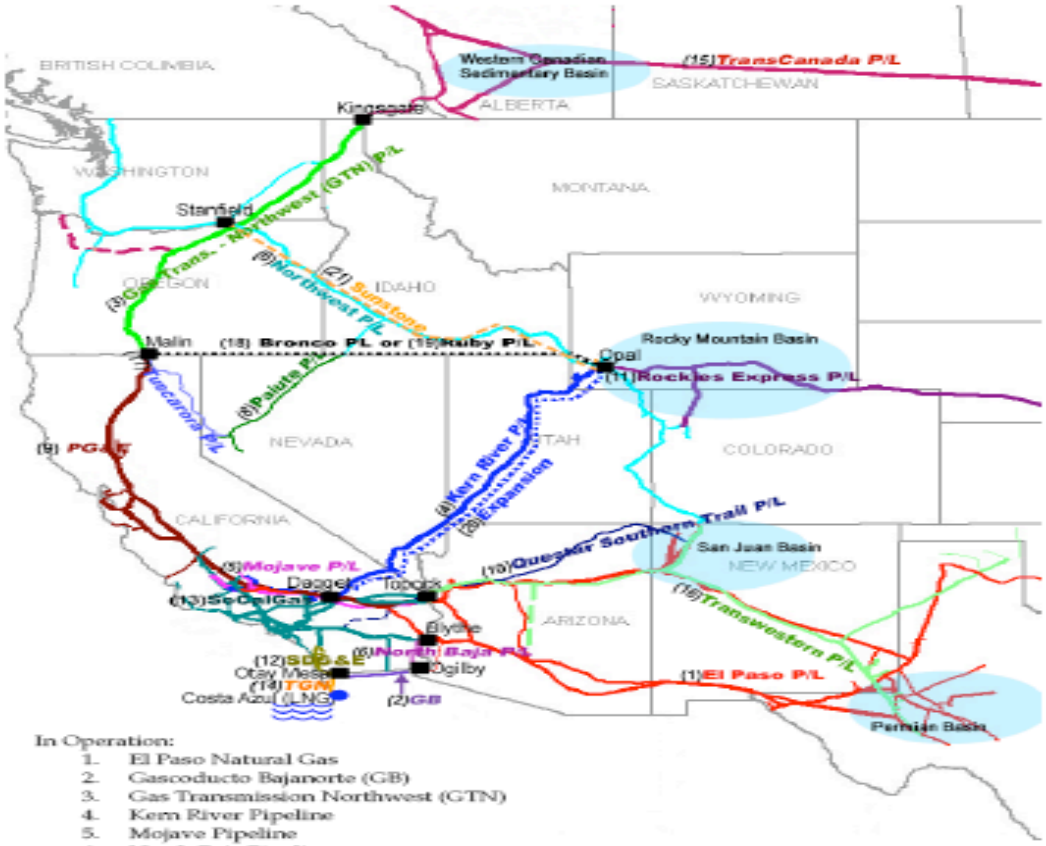
courtesy Halliburton

APPENDIX:

Shale gas can be produced in the $4.50 to $7.50/MMbtu range depending on location. LNG delivered cost on the US Gulf Coast is currently $3.50/MMbtu and $4.50/MMbtu to the west coast of Mexico with costs for new plants in the $6.50/MMbtu range. LNG is priced internationally based on crude oil prices currently in the $8 to $10/ MMbtu range. (Source: Borgstrom and Foti, *Oil and Gas Journal* March 9, 2009)



Western North American Natural Gas Pipelines



In Operation:

1. El Paso Natural Gas
2. Gascoducto Bajanorte (GB)
3. Gas Transmission Northwest (GTN)
4. Kern River Pipeline
5. Mojave Pipeline
6. North Baja Pipeline
7. Northwest Pipeline
8. Paiute Pipeline
9. Pacific Gas Electric Company
10. Questar Southern Trail Pipeline
11. Rockies Express (REX)
12. San Diego Gas &Electric Company
13. Southern California Gas Company
14. Transportadora de Gas Natural (TGN)
15. TransCanada Pipeline
16. Transwestern Pipeline
17. Tuscarora Pipeline

Proposed:

18. Bronco Pipeline
19. Ruby Pipeline
20. Kern River Expansion
21. Sunstone Pipeline

APPENDIX:

North American LNG deliveries are forecast to increase to 1.974 BCF/d in 2009 compared to 1.288 BCF/d in 2008

LNG Supply Forecast					
		(MMcf/d)			
Year	US	Mexico East Coast	Mexico West Coast	Mexico Total	North America Total
2001	656	0	0	0	656
2002	627	0	0	0	627
2003	1,388	0	0	0	1,388
2004	1,781	0	0	0	1,781
2005	1,732	0	0	0	1,732
2006	1,598	38	0	38	1,637
2007	2,113	247	0	247	2,360
2008	961	327	0	327	1,288
2009	1,529	332	113	445	**1,974**
2010	1,813	446	250	696	2,508
	Source: PIRA April 2009				

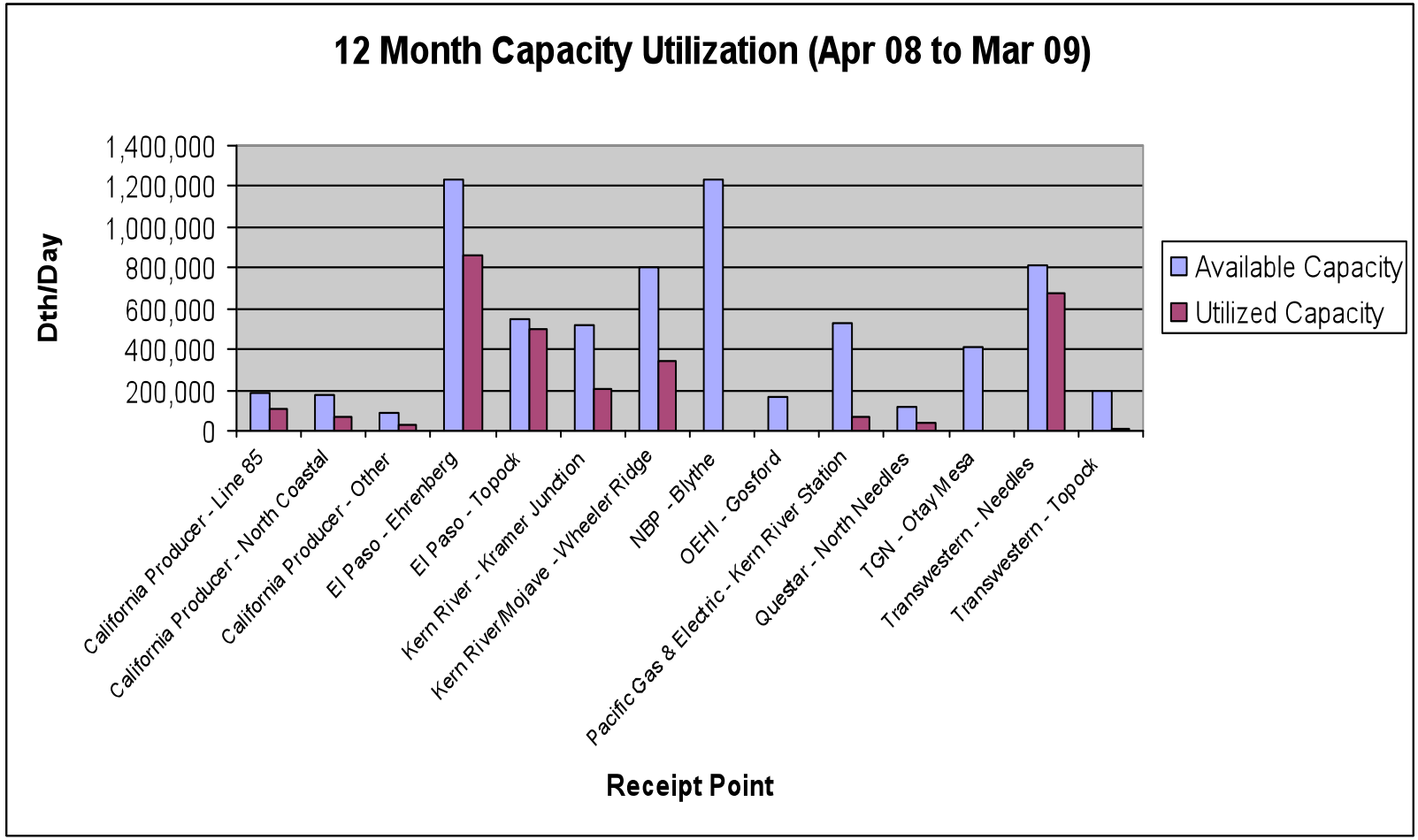
APPENDIX:

SoCalGas has adequate pipeline receipt capacity to meet cold year demand and low hydro conditions.

SoCalGas/SDG&E Current Firm Receipt Capacity

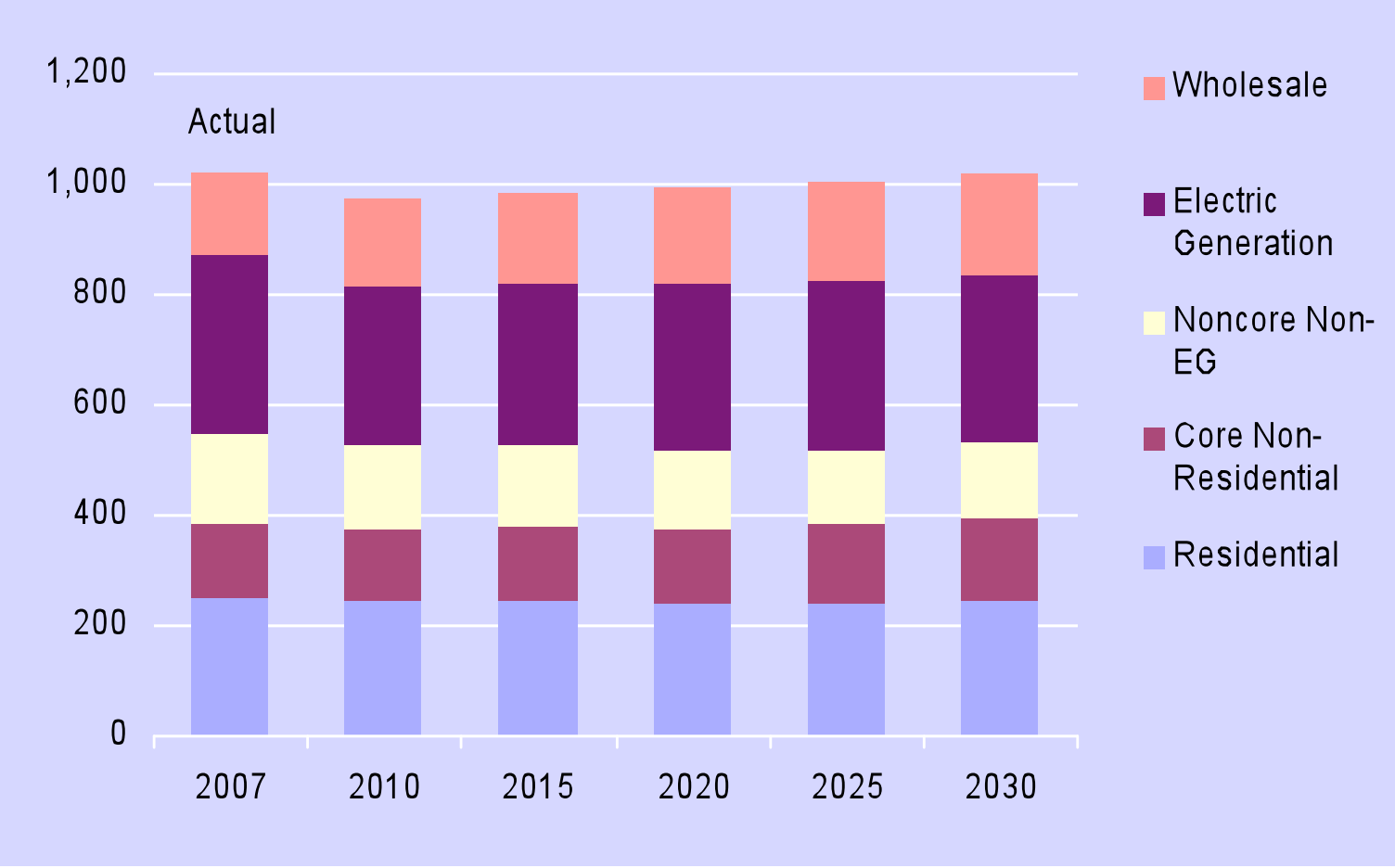
Transmission Zone	Total Transmission Zone Firm Access (MMcf/d)	Specific Point of Access [1] (Limitations)[2] (MMcf/d)
Southern	1,210	EPN Ehrenberg (1,200) TGN Otay Mesa (400) NBP Blythe (1,200)
Northern	1,590	EPN Topock (540) TW North Needles (800) QST North Needles (120) KR Kramer Junction (500)
Wheeler Ridge	765	KR/MP Wheeler Ridge (765) PG&E Kern River Station (520) OEHI Gosford (150)
Line 85	160	California Supply
Coastal	150	California Supply
Other	N/A	California Supply
Total	3,875	

APPENDIX:
SoCalGas has adequate pipeline receipt capacity to meet cold year demand and low hydro conditions.(System-wide daily average utilization = 66% of capacity)



APPENDIX:

SoCalGas' Demand Forecast is relatively flat over the next 20 years



APPENDIX:

California gas demand is forecast to grow at a low rate over the next 20 years due to extensive energy efficiency investments and renewable sources of electricity generation (*California Gas Report 2008).*

STATEWIDE TOTAL SUPPLY SOURCES-TAKEN
Average Temperature and Normal Hydro Year
MMcf/Day

Utility	2008	2010	2015	2020	2025	2030
Northern California						
California Sources [1]	158	158	158	158	158	158
Out-of-State	2,131	2,172	2,064	2,181	2,144	2,135
Northern California Total	2,289	2,330	2,222	2,339	2,302	2,293
Southern California						
California Sources [2]	310	310	310	310	310	310
Out-of-State	2,384	2,286	2,314	2,329	2,355	2,399
Southern California Total	2,694	2,596	2,624	2,639	2,665	2,709
Utility Total	4,983	4,926	4,846	4,978	4,968	5,002
Non-Utility Served Load [3]	1,471	1,438	1,454	1,479	1,498	1,517
Statewide Supply Sources Total	**6,454**	**6,363**	**6,299**	**6,457**	**6,465**	**6,518**

Notes:
(1) Includes utility purchases and exchange/transport gas.
(2) Includes utility purchases and exchange/transport gas and City of Long Beach "own-source" gas.
(3) Consists of California production and deliveries by El Paso, Kern/Mojave and TGN pipelines to industrial, EOR Cogen, EOR steaming and powerplant customers, and gas uses at Blythe and Elk Hills powerplants.
Source: CEC 2007 Natural Gas Market Assessment Report, Dec. 2007 (2008-2017 published in Table J-4).